CLAIMS

1. Compositions for coating having a dry content higher than 80%, preferably of about 85-90% by weight, based on polyisocyanates and PFPE, completely crosslinkable also in a range of temperatures between 5°C and 20°C, said compositions comprising the following components:

- Component 1): mixture comprising:

  1.a) Partially fluorinated prepolymers, having free NCO groups, obtained by reaction of (per)fluoropolyethers (PFPEs) diols having number average molecular weight Mn in the range 800-1,500, preferably 1,000-1,200, with the cyclic trimer of the isophorondiisocyanate (IPDI), in said reaction the ratio in equivalents between the OH/NCO groups being in the range 0.20-0.25,

  1.b) non cyclic isocyanic trimer of hexamethylendiisocyanate (biuret of HDI) having an absolute viscosity at 20°C lower than 5,000 mPa.s,

  in component 1) the ratio referred to the dry product between the compound 1.b) and the compound 1.a) being in the range 10-90, preferably 30-60 parts of compound 1.b)/100 parts of compound 1.a);

- Component 2): (per)fluoropolyether (PFPE) diol having Mn in the range 350-700, preferably 500-650,

the amount of PFPE diol component 2) being such that the ratio in equivalents between the OH and NCO groups in the composition is in the range 0.9-1.1;

- component 3): inert organic solvent under crosslinking conditions, complement to 100% by weight of the composition.

2. Composition according to claim 1, wherein the component 1.a) is obtainable by hot dissolving, preferably at 40°-80°C, the trimer of IPDI and the (per)fluoropolyether diol in a solvent as those indicated in component 3) and maintaining the stoichiometric ratio in equivalents OH/NCO within the indicated limits and a dry content in the range 65%-85% by weight, by adding the polymerization catalyst and hot maintaining the reaction until reaching the theoretic NCO content.

3. Composition according to claims 1-2, wherein as component 2, (2a) mixtures of PFPE oligomer diols having Mn in the range 800-1,500, preferably 1,000-1,200, with PFPE oligomer diols having Mn in the range 350-700, preferably 500-650, are used,

in said mixtures of oligomers the weight ratio between the high and low molecular weight oligomers, respectively, being in the range 1/2-1/10, or the number average molecular weight of the mixtures of PFPE diol oligomers

being lower than or equal to 700.

4. Composition according to claims 1-3, wherein the component 3) is a solvent which does not react with the OH and NCO groups present in the composition of the invention.

5. Composition according to claim 4, wherein component 3 is an aprotic dipolar solvent.

6. Composition according to claims 1-5, wherein the (per)fluoropolyether diol compounds comprise one or more of the following (per)fluorooxyalkylene units $-(C_3F_6O)-$, $-(CFYO)-$, $-(C_2F_4O)-$, $-CR_4R_5CF_2CF_2O-$, $-(CF_2)_{a'}O-$, wherein Y is F or CF_3, R_4 and R_5 are equal to or different from each other and selected from H, Cl, a' is an integer equal to 3 or 4.

7. Composition according to claim 6, wherein the PFPE diols are selected from the following, wherein the (per)fluoropolyoxyalkylene units are statistically distributed along the chain:

aI) $-(C_3F_6O)_{m'}(CFYO)_{n'}-$ wherein the (C_3F_6O) and (CFYO) units are perfluorooxyalkylene units statistically distributed along the chain; m' and n' are integers such as to give the above mentioned molecular weights, and m'/n' are comprised between 5 and 40, n' being different from 0; Y is F or CF_3;

when the unit (CFYO) is absent in this case n' can also be equal to 0;

bI) $-(C_2F_4O)p'(CYFO)q'-(C_3F_6O)t'-$

wherein p' and q' are integers such that p'/q' ranges between 5 and 0.3, preferably between 2.7 and 0.5 and such that the molecular weight is within the above indicated limits; t' is an integer with the meaning of m', Y = F or CF_3; t' can be 0 and q'/(q'+p'+t') is equal to 1/10 or lower and the t'/p' ratio ranges from 0.2 to 6;

cI) $-CR_4R_5CF_2CF_2O-$ wherein R_4 and R_5 are equal to or different from each other and selected from H, Cl, the molecular weight such as to be comprised in the above mentioned limits, a fluorine atom of the perfluoromethylene unit can be substituted with H, Cl, or perfluoroalkyl group, having for example from 1 to 4 carbon atoms;

dI) $-(CF_2)_{a'}O-$ wherein a' is an integer equal to 3 or 4.

8. Composition according to claims 6-7, wherein the two end groups, equal to or different from each other, of the bifunctional (per)fluoropolyethers are of the type

$$HO(CH_2CH_2O)_{x0}CH_2-CF_2-$$

wherein x0 is an integer from 0 to 4, preferably from 0 to 2; in the preferred compounds x0 = 0; said end group

being linked to the (per)fluorooxyalkylene unit by an oxygen atom but not by peroxidic sequences -O-O-.

9. Compositions according to claims 1-8 which can be formulated both as monocomponent and as bicomponent.

10. Composition according to claim 9, wherein the bicomponent formulation comprises A (components 1.a + 1.b) and B (component 2), the solvent being added in A and/or in B.

11. Compositions according to claims 1-10, containing additives such as pigments and fillers, preferably dispersed or pre-dispersed in component 2), thixotropic agents, polymer dispersing agents acrylic, silicone, polyurethane, polyamine, or having a carboxylic or non ionic functionality; stretching, anticissing, antifoam additives, additives to reduce photooxidation such as UV adsorber and hindered amines (HALS).

12. Compositions according to claims 1-11 crosslinked by addition of a catalyst.

13. Composition according to claim 12, wherein the catalyst is selected from the following classes: metal or amine catalysts, preferably tertiary amines such as triethylendiamine, N-ethyl-ethylendiamine, tetramethylguanidine, dimethyl cyclohexylamine, diazobicyclo octane; organometal catalysts such as dibutyltindilaurate, tin octonoate,

cobalt naphthenate, vanadium acetylacetonate, dimethyl-tin-diethylhexanoate, dibutyltin diacetate, dibutyltin dichloride, and mixtures thereof; the catalyst being added in concentrations generally ranging from 0.1 to 2% by weight and preferably from 0.5 to 1%.

14. Coating obtainable by the compositions of claims 12-13.